Ideal for monitoring opacity and smoke levels in the exhaust gas of industrial combustion or air filtration processes.

- **In situ measurement directly in exhaust gas flow using the widely accepted light transmission technique**
- **Measurement reading as % Opacity**
- **Modulated green LED source for long lifetime stability and immunity to ambient light**
- **Rugged 316L stainless steel construction**
- **Free utility software for PC based setup, control, and data logging**
- **Optional Operator Interface with different mounting configurations**

The DSL‑220 is an optical instrument designed to measure the visible opacity (0‑100%) of exhaust gas in a duct, stack, or flue; typically the exhaust gas from an industrial combustion process or air filtration system.

The DSL‑220 uses the standard single pass transmission measurement technique, with Transmitter/Receiver arrangement. A light beam emitted from the Transmitter passes across the stack to a Receiver, which measures the intensity of the received light. Increased particulate or smoke density in the stack gas attenuates the transmitted light and causes the intensity of the received light to fall. This reduction in intensity is measured and presented as % opacity.

The light source in the transmitter is a high intensity, high reliability green LED which provides long life and stable intensity. The transmitted light beam is pulsed to give complete immunity to ambient light levels. The intensity of the transmitted light is monitored at source so that any variations in the emitted light level are compensated for at the Receiver. The Receiver has on board temperature measurement to provide stability over temperature.

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The DSL-220 is available with or without an Operator Interface (control unit), so for the most cost effective monitoring solution the DSL-220 can operate as a "stand-alone" instrument consisting of the Transmitter head (TX) and Receiver head (RX), with all electrical connections (including outputs such as the alarm relays, 4-20mA and Modbus) being made inside the RX head. As a stand-alone instrument the DSL-220 is set-up and controlled using the supplied utility software, installed on a PC or laptop, and connected via the USB connector on the RX.

When supplied with an Operator Interface (OI) all power supply and output connections are made in the OI rather than the RX. The OI is available in a range of enclosure styles, it has a bright 4 digit LED display and a simple 4 button keypad, which allows full command and control of the instrument. Alternatively, the free utility software can be connected to the OI and used to command and control the DSL-220 directly from a PC.

The DSL-220 has no moving parts, is of rugged design and has an excellent reliability record. Regular maintenance simply involves cleaning the TX and RX lenses, which are easily accessible due to our latched head design. Both the TX and RX heads are supplied with an air purge body, which when connected to a high volume source of clean air, keeps the contaminated stack gas away for the lens surfaces. An Aluminium air purge body is available for use on standard installations and a more advanced Stainless Steel air purge body is available for more demanding installations.

DSL-220 MkIII
Single Pass Opacity Monitor
Measures 0-100% Opacity

Specification:

Measurement Performance

No.	Parameter	Units	Min	Max	Comment
1	Path Length (flange to flange)	m	0.5	20	Flange-to-flange separation
2	Measuring Range	%	0.0	100.0	User selectable
3	Accuracy	%	−2	+2	
4	Resolution	%		0.1	Display resolution
5	Damping	s	1	60	Selectable
6	Drift with Temperature	%	−2	+2	Over any 20°C in the operating range
7	Operating Wavelength	nm	510	540	Green LED

Power & Air Requirements

No.	Parameter	Units	Min	Max	Comment
8	Voltage	Vdc		+24	Optional 90-260Vac PSU available
9	Voltage Tolerance	%	−10	+10	
10	Nominal Current Consumption	mA		400	
11	Power Up Current Consumption	mA		400	
12	Air Supply Volume Flow	L/min	50	200	To each air-purge body.
13	Air Supply Fitting				1" BSP threaded aperture in each air-purge body

Cable and Wire

No.	Parameter	Units	Min	Max	Comment
14	Cable type – TX/RX Interconnection	cores	6		Screened multi-core, such as Belden 9873
15	Cable type – OI/RX Interconnection	cores	4		Screened multi-core, such as Belden 9873
16	Wire Size at Terminal Connections	AWG	20	14	

Interface Options

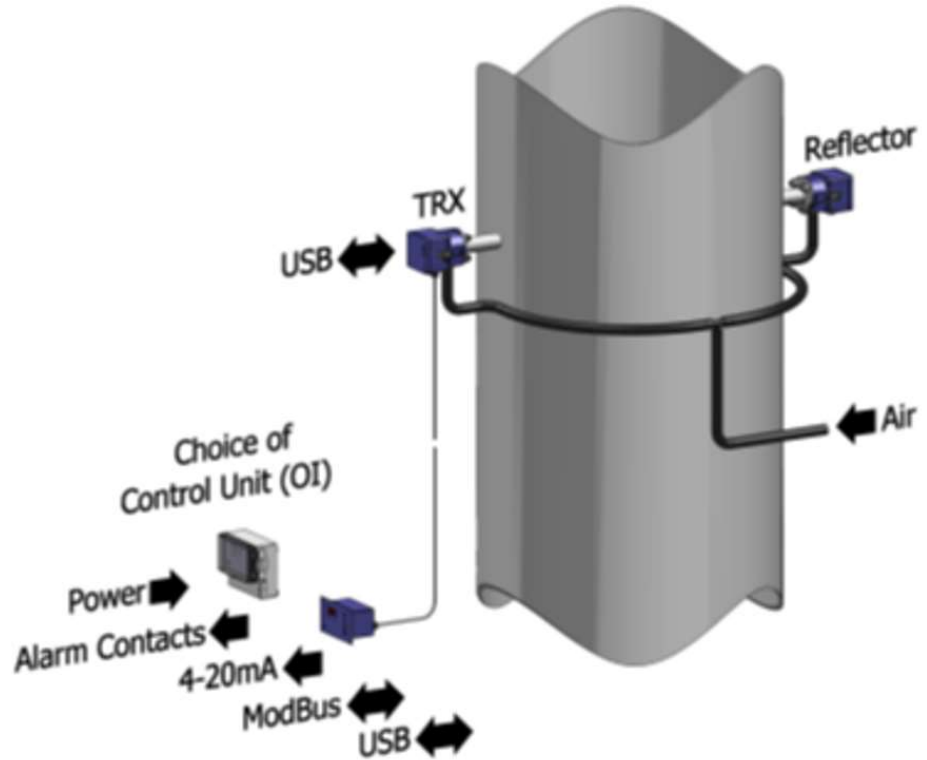| No.	Parameter	Units	Min	Max	Comment
17	Serial Comms				ModBus RTU via RS485 (RX) Internal USB (OI), external USB (RX)
18	Analogue Output (one)	mA	4	20	Isolated and scalable
19	Digital Relay Contacts (two)	A	0	3	@30Vdc (signal level and data valid)

Physical

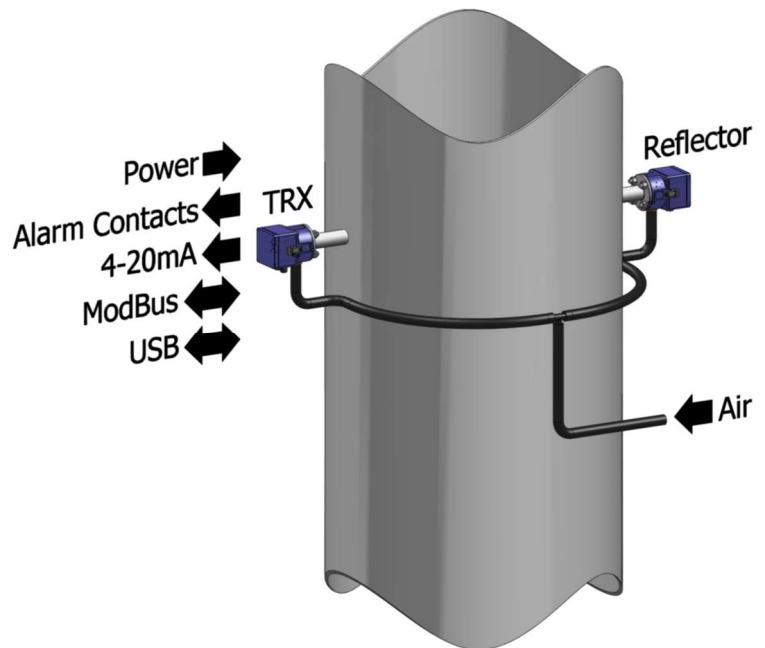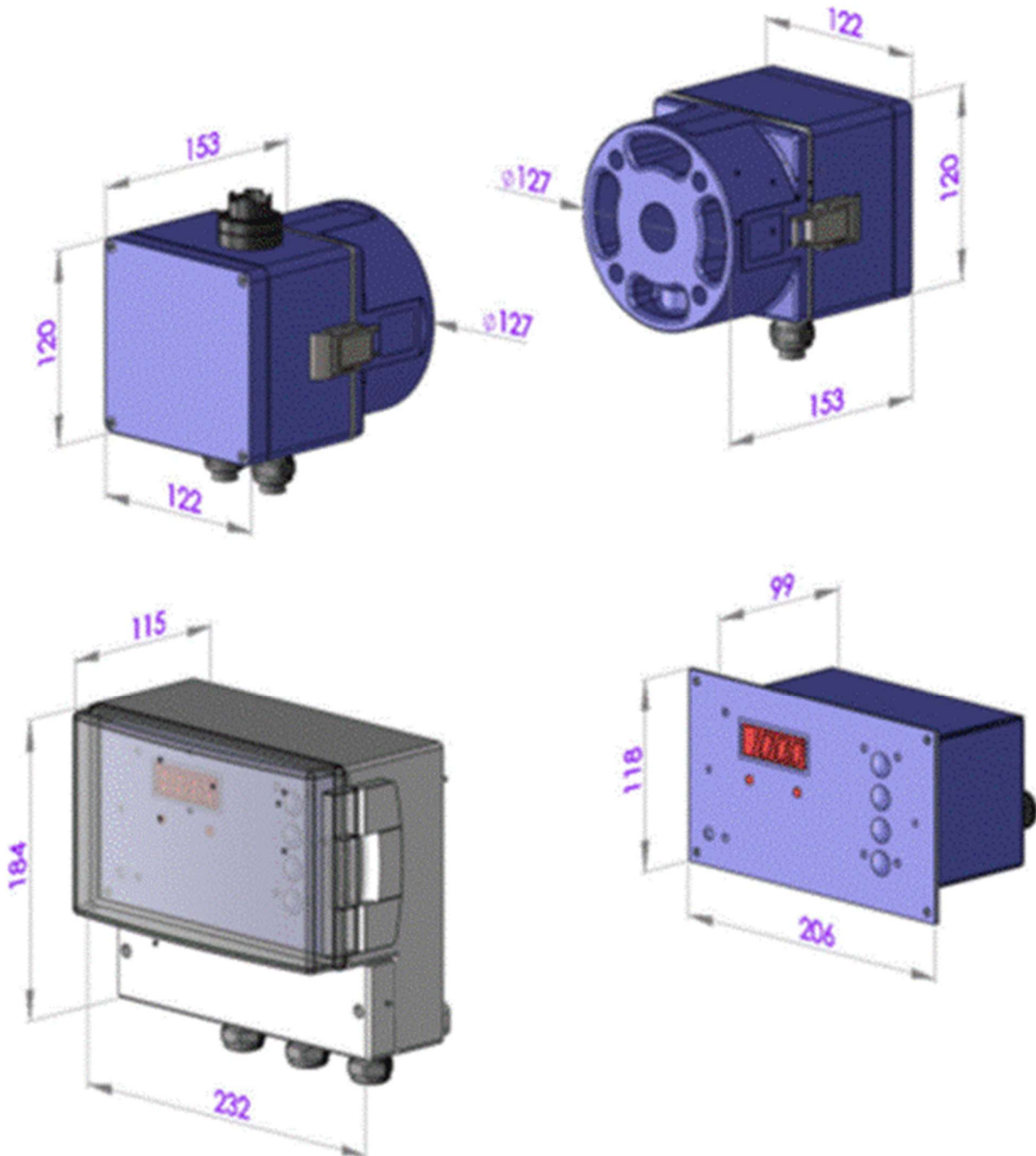| No.	Parameter	Units	Min	Max	Comment
20	Ingress Protection: - TX/RX Heads		IP65		For external use
21	- OI Wall Mounted - OI Panel Mounted		IP65 IP64		Hinged door and terminal compartment shut. From front face of panel when installed.
22	Ambient Operating Temperature	°C	−20	+55	Air temperature around the heads.
23	Operating Humidity	%		100	Air humidity around the heads.
24	Gas Temperature	°C		+600	Heat insulating gaskets included. (Higher temperatures on request)
25	Regulatory Compliance		2014/30/EU (Electromagnetic Radiation) 2014/35/EU (Low Voltage)		
26	Materials: - TX/RX Heads		AISI/SAE 316L stainless steel		
27	Materials: - Air-Purge Bodies		Powder coated cast aluminium or stainless steel for demanding installations		
28	Materials: - OI Wall Mounted		UL rated polycarbonate enclosure; aluminium front panel with PU laminate overlay and with nylon cable glands		
	- OI Panel Mounted		Powder coated steel back-box; aluminium front panel with PU laminate overlay and with nylon cable glands		
29	Weight	kg		2.5	TX or RX head plus Aluminium Air-Purge body
30	Weight: - OI Wall Mounted - OI Panel Mounted	kg		1.3 1.3	
31	Warranty	months	24		Return to base warranty. Extensions available

Configuration Options:

Configured with an OI: Wall or Panel Mounting

Stand Alone Configuration

Dimensions (mm):

153

120

122

ø127

122

120

ø127

153

115

184

232

99

118

206

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Ordering Details:

DSL-220-XXXX-MKIII

A = Aluminium air-purge body (standard applications)
S = Stainless steel air-purge body (demanding applications)

D = 24 Vdc powered
A = 100-240 Vac powered

N = No OI
W = Wall mounted OI
P = Panel mounted OI

S = Short path length version (0.5m – 3m flange to flange)
L = Long path length version (2m – 20m flange to flange)
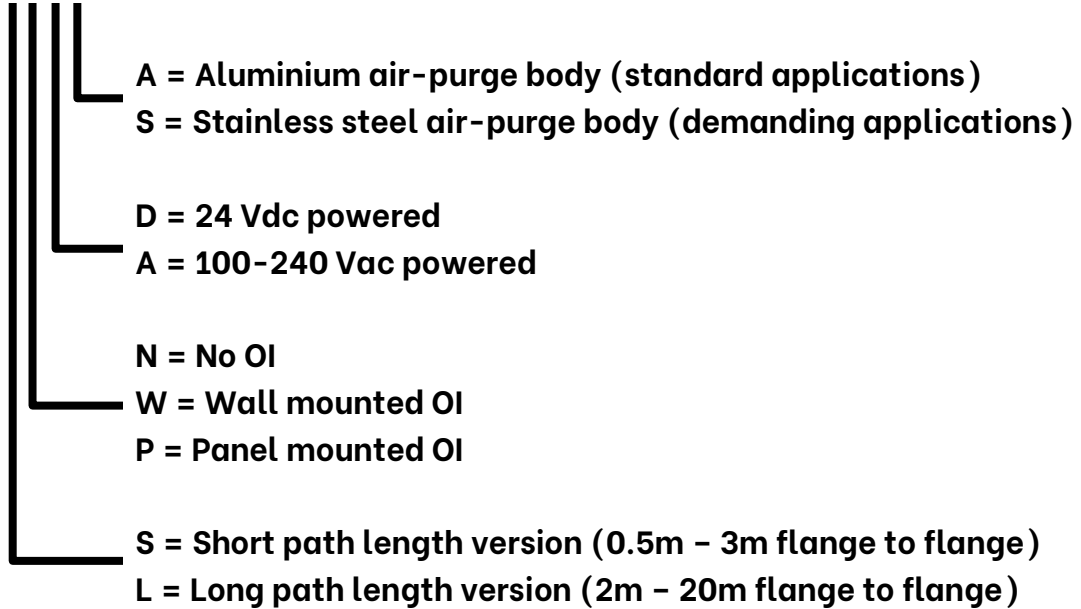
Options & Accessories:

Description	Order Code	Notes
Mounting Flange	ASY-067	1.5" ANSI 150 flange pattern with 240mm long extension tube (x2).
Fixing Kit for use with Aluminium Air Purge Body	ASY-071	Contains M14 x 100mm studding, flat washers, spring washers and M14 nuts.
Fixing Kit for use with Stainless Steel Air Purge Body	ASY-245	Contains M14 x 100mm studding, flat washers, spring washers and M14 nuts.
Weather Cover	ASY-080	Hinged stainless steel weather / heat cover for protecting externally mounted heads.
Screened Cable	CBL-099	7-core, screened LSZH cable.
Boxed PSU	DSL-PSU-25	Multi AC input, 24Vdc output 75W, IP67 rated enclosure
Laser Alignment Tool	DSL-LAT08	Tool to aid the alignment of the two heads across the stack.

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Blower Kit		DSL-BK40B-110	Blower kit for purge air. 110 Vac; single phase
		DSL-BK40B-230	Blower kit for purge air. 230 Vac; single phase
		DSL-BK40B-415	Blower kit for purge air. 415 Vac; three phase
Compressed Air Kit		DSL-CAK-2	For use with compressed air purge. Includes pressure regulator, in-line filters, and compressed air adaptors for the purge body.
Calibration Head		DSL-CH350BA	For use between the RX head and the purge body to perform calibration checking with aluminium type air-purge bodies. (Calibration head only, no filters included).
		DSL-CH350BS	For use between the RX head and the purge body to perform calibration checking with stainless steel type air-purge bodies. (Calibration head only, no filters included).
Calibrated Opacity Filters		ASY-190	Calibration filter, approx. 8% opacity
		ASY-133	Calibration filter, approx. 20% opacity
(other values available on request)		ASY-183	Calibration filter, approx. 35% opacity

Note that the actual part may differ from the above representative pictures.

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